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INSTITUTE OF CHEMISTRY

OF

GREAT BRITAIN AND IRELAND.

(INCORPORATED BY ROYAL CHARTER.)

Physical & Applied Sci. Serials

REGULATIONS

FOR THE

ADMISSION OF STUDENTS, ASSOCIATES, AND FELLOWS.

EXAMINATION PAPERS: 1901 - 1902.

JULY, 1902.

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INSTITUTE OF CHEMISTRY

OF

GREAT BRITAIN AND IRELAND.

FOUNDED OCTOBER, 1877.

INCORPORATED BY ROYAL CHARTER OF THE 13th DAY OF JUNE, 1885.

Regulations for the Admission of Students, Associates, and Fellows,

1902 - 1903.

(EXAMINATION PAPERS FOR 1901-1902.)

Issued by Order of the Council,

RICHARD B. PILCHER,
Registrar and Secretary.

JULY, 1902.

All Communications with reference to the Regulations should be addressed to

THE REGISTRAR OF THE INSTITUTE OF CHEMISTRY,

30, BLOOMSBURY SQUARE, LONDON, W.C.

Office Hours: 10 a.m. to 4 p.m.; Saturdays, 10 a.m. to 2 p.m.

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INSTITUTE OF CHEMISTRY

OF

GREAT BRITAIN AND IRELAND.

INTRODUCTION.

1.—The Institute of Chemistry was founded in October 1877, and incorporated by Royal Charter in June, 1885, (i) to promote the better education of persons desirous of becoming public and technical analysts and chemical advisers on scientific subjects; (ii) to examine candidates, and to grant certificates of competency; and (iii) to elevate the profession of Consulting and Analytical Chemistry by setting up a high standard of scientific and practical proficiency and by insisting on the observance of strict rules in regard to professional conduct.

2.—In pursuance of the provisions of the Charter and Bye-Laws, the Council have made Regulations for the Admission of Students, Associates and Fellows.

No person can become an Associate of the Institute until he has attained the age of twenty-one years. He must have passed an approved Preliminary Examination in subjects of general education, and such other Examinations in scientific subjects as are prescribed by the Council, after having systematically studied

Theoretical and Analytical Chemistry, Theoretical and Practical Physics, Elementary Mathematics, and one other allied science, for at least three years in a recognised Institution.

There are three Examinations for admission to the grade of ASSOCIATE, viz. :—

I. The Preliminary Examination in subjects of General Education. (See page 5.)

II. The Intermediate Examination in general Theoretical and Practical Chemistry. (See pp. 12-16.)

III. The Final Examination in a Branch of Chemistry selected by the Candidate. (See pp. 16-18.)

In order to become eligible for the Fellowship, an Associate is required to have been continuously engaged for a further term of three years in the study and practical work of applied Chemistry in a manner satisfactory to the Council.

Any Fellow of the Institute may use the initials F.I.C., and any Associate of the Institute, the initials A.I.C.

INSTITUTE OF CHEMISTRY.

Preliminary Examinations.

EXCEPTIONS.

The following Examination will be accepted as an approved Preliminary Examination if passed in all of the compulsory subjects at one and the same Examination prior to 31st December, 1900:

College of Preceptors: Examination for a Second Class Certificate in the First or Second Division.

Any of the following Examinations will be accepted if passed in all of the compulsory subjects at one and the same Examination prior to 31st *December*, 1901:

The Junior Local Examinations of the Universities of Aberdeen, Cambridge, Edinburgh and Oxford.

The Examinations for the Lower Certificates of the Oxford and Cambridge Schools Examination Board, of the Scotch Educational Department, and of the Intermediate Educational Board of Ireland.

The Preliminary Examination in Arts for graduation in Medicine and Science in the University of Durham.

The Entrance or Matriculation Examination in the Universities of Allahabad, Calcutta, Madras, Punjaub, and of King's College, Windsor, Nova Scotia.

The following Examination will be accepted if passed in all of the compulsory subjects at one and the same Examination prior to 31st *December*, 1902:

The Preliminary Medical Examination of the Educational Institute of Scotland.

3.—PRELIMINARY EXAMINATION IN SUBJECTS OF GENERAL EDUCATION.

Candidates must pass this examination before they can be registered.

The Council will accept as an approved Preliminary Examination any examination mentioned below; but the Candidate must produce the Certificate of having passed the full examination, and this Certificate must show that he passed, at one and the same time, in all of the following compulsory subjects:—

(*a*) English Language.

(*b*) Latin.

(*c*) Mathematics, comprising Arithmetic, Algebra to simple equations inclusive, and Geometry, including Euclid, Books I., II., III.

(*d*) One of the following:—French, German, Italian, any other Modern Language approved by the Council, Greek, or Logic.

APPROVED PRELIMINARY EXAMINATIONS.

Note.—Application for information concerning the Regulations of the following Examinations should be made to the respective Examining Bodies.

Universities in Great Britain and Ireland.

University of Aberdeen.—Senior Local Examination. Preliminary Examinations for Graduation in Arts, Science, or Medicine.

University of Birmingham.—Matriculation Examination.

University of Cambridge.—Senior, or Higher Local Examination. Previous Examination. General Examination.

University of Dublin.—Public Entrance Examination. Examination for the First, Second, Third or Fourth Year in Arts.

University of Durham.—Examination for a Certificate of Proficiency. The Senior Local Examination.

University of Edinburgh.—Senior Local Examination. Preliminary Examinations for Graduation in Arts, Science, or Medicine.

University of Glasgow.—Preliminary Examinations for Graduation in Arts, Science, or Medicine.

University of London.—Matriculation Examination.

University of Oxford.—Senior Local Examination. Responsions. Moderations.

University of St. Andrews.—Preliminary Examinations for Graduation in Arts, Science, or Medicine. Final Examination for the Diploma of L.L.A.

Royal University of Ireland.—Matriculation Examination.

Victoria University.—Preliminary Examination. Entrance Examination in Arts or Science.

University of Wales.—Matriculation Examination.

Other Educational Bodies in Great Britain and Ireland.

College of Preceptors.—Examination for a First Class (or Senior) Certificate.

Glasgow and West of Scotland Technical College.—Preliminary Examination for Diploma Students.

Intermediate Educational Board of Ireland.—Senior Grade Examination.

Oxford and Cambridge Schools Examinations Board.—Higher Certificate.

Scotch Educational Department.—Examination for Higher Grade or Honours Leaving Certificates.

Central Welsh Board.—Senior Certificate Examination.

Indian, Colonial and Foreign Universities and Colleges.

No Certificate from the Bodies mentioned below will be accepted unless it shows:—That the Examination has been conducted by or under the authority of the body granting it; that it includes all the subjects required by the Council and, states that all the subjects of Examination have been passed at one time.

Continental Bodies.

The German Abiturienten-Examen of the Gymnasia and Real-gymnasia; Examinations entitling to the French Diplomas of Bachelier ès Lettres and Bachelier ès Sciences, and other corresponding Entrance Examinations to the Universities.

India and Ceylon.

Allahabad University.—Intermediate Examination in Arts.

Bombay University.—Matriculation Examination.

Calcutta University.—First Examination in Arts.

Ceylon Medical College.—Preliminary Examination.

Madras University.—First Examination in Arts.

Punjab University.—Intermediate Examination in Arts.

(In the case of natives of India or other Oriental Countries an Examination in a Classic Oriental Language may be accepted instead of an Examination in Latin.)

Cape Colony.

Cape of Good Hope University.—Matriculation Examination.

Egypt.

The Secondary Education Certificate of the Egyptian Government.

PRELIMINARY EXAMINATION.

Canada.

Kingston: Queen's University.—Departmental Arts Matriculation Examination.

Manitoba University.—Preliminary and Previous Examinations.

Montreal: University of Bishop's College.—Matriculation Examination.

University of McGill College.—Matriculation Examination.

Newfoundland Medical Board.—Preliminary or Matriculation Examination.

New Brunswick: Universities of Frederickton and Mount Allison College.—Matriculation Examinations.

College of Physicians and Surgeons. — Matriculation Examination.

Nova Scotia: Dalhousie College and University, Halifax.—Matriculation Examination.

Provincial Medical Board.—Preliminary Examination.

Ontario University.—Departmental Arts Matriculation Examination.

College of Physicians and Surgeons.—Departmental Arts Matriculation Examination.

Quebec: College of Physicians and Surgeons of the Province.—Matriculation Examination.

Toronto University.—Departmental Arts Matriculation Examination.

Trinity Medical College.—Departmental Arts Matriculation Examination.

Trinity University.—Departmental Arts Matriculation Examination.

Victoria University.—Departmental Arts Matriculation Examination.

Malta.

University of Malta.—Matriculation Examination.

Australasia.

Adelaide University.—Senior Public Examination. First Year Examination in Arts.

Melbourne University.—Matriculation Examination.

Sydney University.—Matriculation Examination. First year Examination in Arts. Senior Public Examination. Entrance Examination for Medicine and Science.

Tasmania University.—Senior Public Examination.

New Zealand.

New Zealand University.—Preliminary Examination.

Otago University.—Preliminary Examination.

4.—REGULATIONS FOR THE ADMISSION OF STUDENTS.

1. **A Candidate is eligible for registration as a Student at any period during his training, provided that he can produce evidence satisfactory to the Council—**

(*a*) That he is not less than 17 years of age.

(*b*) That he has passed an approved Preliminary Examination in all of the requisite subjects at one time (see p. 5).

(*c*) That he is, at the time of application, a student at one of the Universities, Colleges or Schools approved by the Council (p. 42), or a pupil of a Fellow of the Institute, and is *bonâ fide* in course of preparation and training with the object of adopting the profession of Analytical and Consulting Chemistry.

(*d*) That he has paid his first Registration Fee of Five Shillings.

Forms of application can be obtained from the Registrar.

2. The Registration Fee is due on admission and on the first day of January in each year. Any Student who omits to pay his Annual Registration Fee, when due, shall, on a Resolution to that effect being passed by the Council, have his name removed from the Register.

3. All Students of the Institute are required to present themselves for Examination within the term of five years from the date of their admission, otherwise their names will be removed from the Register, unless they can give reasons satisfactory to the Council for an extension of the time being granted.

Students receive, gratis, the "Proceedings" as published.

GENERAL REGULATIONS AS TO TRAINING.

No course of lectures or other form of instruction in the requisite subjects will be recognised as part of the curriculum for Candidates for the Associateship unless it is given *in the day-time* by the Professor of the subject, in one of the recognised Institutions (p. 12), or in the case of Laboratory work, by duly appointed Assistants, acting under the supervision of the Professor ; and unless at the same time sufficient evidence is afforded by the Candidate that during the period of attendance upon such instruction, the whole of his time has been occupied in study or in Laboratory practice, either in a *recognised* College, or in the case of Students who are pupils of Fellows of the Institute (B p. 12), partly in a recognised College and partly in the Laboratory of such Fellow.

Theoretical and Practical Chemistry are to be regarded as the principal subjects; the other subjects are subsidiary, and should occupy a relatively small proportion, as a rule not more than one-fourth, of the student's time.

A careful inspection of the Syllabus of each of the Examinations held by the Institute will give the Candidate a good general idea of the extent of the knowledge of Chemistry he is expected to acquire. In addition to systematic analytical practice, every Candidate should be able to use the microscope, spectroscope, polariscope, refractometer, and other instruments commonly used in Chemical Laboratories, and should also be able to draw diagrams of apparatus and instruments.

Attention is directed to the importance of Candidates keeping complete records of their practical work. When presenting themselves for examination, they are required to forward such records for inspection by the Examiners, who will take them into account in deciding the Examination. Candidates are expected to be able to use logarithms in their chemical calculations.

*

5.—COURSES OF TRAINING AND QUALIFICATIONS REQUIRED FOR THE ASSOCIATESHIP.

Every Candidate for the Associateship is required to produce—

1. A certificate of birth or baptism as evidence of age.

If the Regulations have been complied with, a Candidate who is under 21 years of age may enter for the Examinations, but he cannot be *elected* to the Associateship before he has attained that age.

2. A satisfactory certificate of moral character.

Unless a Candidate for the Associateship has passed any of the Examinations mentioned on p. 12 (Section 6, Clause 2), or on p. 16 (Section 7, Clause 2), he is required to produce evidence of having complied with Clauses 3 and 4 (A or B), before presenting himself for the Examinations conducted by the Institute:—

3. That he has passed an approved Preliminary Examination (see page 5).

4. That he has completed one of the following courses of training, **A** or **B** (p. 12) :—

COURSE—**A.**

(*a*) That he has passed satisfactorily through a systematic course of study extending over at least *three academic years*', and has passed the Class Examinations in **Theoretical and Practical Inorganic and Organic Chemistry**, in any one or more of the Universities or Schools approved by the Council (see p. 42). The amount of practical work shall occupy, on the average during the three years, at least 15 hours per week.

(*b*) That he has worked for at least 100 hours in the Physical Laboratory, has attended at least 50 Lectures on **Physics**, and has passed the Class Examinations in this subject at such University, College or School.

(*c*) That he has attended Lectures on **Elementary Mathematics** and has passed the Class Examinations in this subject at a recognised University, College or School. The Lectures and Examinations must include: Euclid, Books I., II., and III.; Algebra to Quadratic Equations, Ratio and Proportion; Plane Trigonometry to Solution of Triangles, Heights and Distances, Area of a Triangle, and Use of Logarithms.

A certificate of having satisfactorily passed an approved Examination in Mathematics covering the work indicated above will be accepted by the Council in lieu of evidence of a course in this subject having been taken.

(*a*) That he has also attended a course of instruction and passed the Class Examinations in **one optional subject** selected by himself from the following list, viz.:—

(i) Mathematics:—Trigonometry, Differential and Integral Calculus.

(ii) Elementary Mechanics, Steam, and General Chemical Engineering:—Properties of Constructive Materials:—Timber, Iron, Steel, Masonry. Principles of Construction of Boilers, Steam Engines, Gas Engines, Water-Wheels, and Turbines, Pumping Engines and Pumps. Dynamo Machines, and Secondary Batteries. Furnaces (40 to 50 Lectures, or an equivalent amount of instruction.)

(iii) Metallurgy:—Furnace Materials and Construction: Fuel (solid, liquid and gaseous), Mechanical Stokers, Pyrometers, Calorimeters. Manufacture and Properties of Iron and Steel. Manufacture of any two other Metals, and their properties. Assay of the metals chosen to be learnt practically. (40 to 50 Lectures, or an equivalent amount of instruction).

(iv) Geology and Mineralogy:—About 40 to 50 Lectures or an equivalent amount of other instruction, with sufficient field or laboratory work once a week for a year, on general Physical and Stratigraphical Geology, Mineralogy, Petrography, and Economic Geology, with special reference to coal-fields, ore deposits, water supply, and drainage.

(v) Elementary Physiology:—General Biology of Plants and Animals illustrated by reference to the Structure and Life History of selected types. Histology of Simple Tissues. Composition of Human Food and its Digestion. Circulation of the Blood, Respiration, Secretion and Excretion, Animal Heat. The Functions of the Nervous System. (40 to 50 Lectures or an equivalent amount of instruction, with Practical work on the qualitative and quantitative Examination of blood, mine, bile, and milk.)

(vi) Bacteriology:—The use of the Microscope. The Morphology and Physiology of Micro-organisms. Forty to fifty lectures, or an equivalent amount of instruction with practical work, to include the recognition of microscopic specimens, with systematic instruction and practice in the preparation, staining, mounting and drawing of specimens, as well as the preparation and study of pure cultures.

COURSE B.

(*a*) That during at least *two academic years* he has regularly attended systematic day courses in each of the following subjects, at any one or more of the Universities, Colleges or Schools, approved by the Council (p. 42), and has passed the Class Examinations in them :—

Theoretical Chemistry, including the ordinary day courses of Lectures on Inorganic and Organic Chemistry given by the Professor ;

Practical Chemistry, including systematic Laboratory Work, three days in each week, and at least five hours each day ;

Physics (as on p. 10) ;

Elementary Mathematics (as on p. 11) ; and

One Optional Subject, selected from the list on p. 11 ; and

(*b*) That he has also been systematically engaged in Analytical Chemistry for *two other years* in the Laboratory of a Fellow of the Institute.

6.—REGULATIONS FOR THE INTERMEDIATE EXAMINATION IN THEORETICAL AND PRACTICAL CHEMISTRY.

1. Candidates who have complied with the conditions of Clauses 1, 2, 3 and 4 of Section 5 are eligible for admission to the Intermediate Examination. Forms of application can be obtained from the Registrar.

2. Candidates who have obtained the Pass Degree of Bachelor of Science in a recognised University, and have complied with Clauses 1 and 2 of Section 5, are also eligible for admission to the Intermediate Examination,

provided that they produce evidence, satisfactory to the Council, that they have passed the Final or Degree Examination in Theoretical and Practical Inorganic and Organic Chemistry, and Theoretical and Practical Physics, and that they passed the Intermediate University Examination, or the Final University Examination in Mathematics covering the course set forth on p. 11.

3. On or before the date fixed for the closing of the List for each Intermediate Examination, every Candidate desirous of presenting himself is required to forward :—

(1) The form of application duly filled in and accompanied by Certificates containing evidence that the Candidate is entitled to present himself for Examination in accordance with the Regulations.

(2) The Examination Fee (see below).

(3) Note-books containing records of the practical chemical work of all kinds performed during training, the genuineness of the records to be attested by himself and his professors or teachers, according to the note-book form which may be obtained on application to the Registrar.

4. The note-books will be submitted to the Examiners, who will take their contents into consideration and will have power to submit any Candidate to a *viva voce* examination upon them.

5. During the Practical Examinations Candidates will be at liberty to consult any books of reference which they may bring with them, and they may obtain access to the books in the Reference Library of the Institute.

6. The Examination Fee of Three Guineas (£3 3s.) shall be paid at the time of making application for admission to this Examination. If a Candidate withdraws his name, or fails to present himself at the Examination, or fails to pass it, the Fee shall not be returned to him, but he shall be allowed to enter for *one* subsequent Intermediate Examination upon payment of an additional Fee of Two Guineas (£2 2s.). Candidates who have failed more than once are required to pay the full fee of Three Guineas (£3 3s.).

SYLLABUS OF THE INTERMEDIATE EXAMINATION.

The Intermediate Examination occupies at least four days, from 10 *a.m. to* 4.30 *p.m. on each day.*

The Examiners are at liberty to put questions to Candidates at any time during the examination.

The Examination consists of (A) and (B) following :—

(A) **Examination in General Theoretical Chemistry.**

Candidates are required to show a thorough acquaintance with the fundamental laws of Chemistry ; with the methods of preparation of the more important elements, and their compounds both inorganic and organic ; with the principles of Chemical Classification ; and with the current theories of Chemical Science. At least two papers, including questions in both Inorganic and Organic Chemistry, will be set.

(B) **Examination in Practical Chemistry.** This Examination will be partly qualitative and partly quantitative :

QUALITATIVE.

1. Exercises in qualitative analysis : such as the analysis of artificial mixtures of moderate complexity, of alloys, and of ores,

and the detection of specified substances present in minute quantities, or as impurities, in commercial products.

2. Preparation of substances so chosen as to elicit evidence of the Candidate's acquaintance with ordinary chemical operations, such as crystallisation, solution, distillation, &c.

3. The recognition, by practical tests, of familiar typical inorganic and organic compounds.

4. The examination of gases, and the detection of one or more of the following in a gaseous mixture: hydrogen, chlorine, hydrogen chloride, hydrogen sulphide, oxygen, ozone, carbon monoxide, carbon dioxide, sulphur dioxide, nitrogen, ammonia, nitric oxide, methane, ethylene, and acetylene.

5. The use of the spectroscope: recognition and diagrammatic plotting of spectra.

6. The use of the microscope: preparation, mounting and measurement of specimens.

QUANTITATIVE.

1. The gravimetric and volumetric estimation of commonly occurring substances.

2. The determination of carbon and hydrogen, nitrogen, sulphur, or halogens, in organic compounds.

3. The volumetric determination of one or more of the constituents in a mixture which may contain hydrogen, oxygen, carbon monoxide, carbon dioxide, nitrogen, methane, and ethylene.

4. Determination of boiling point, melting point, relative density, or solubility.

5. The use of the calorimeter and the polariscope.

The examination in quantitative analysis may include the performance of some operation selected from the Candidate's own record.

In doing combustions, the Candidate will be required to prepare his own combustion tubes and drying tubes.

7.—REGULATIONS FOR THE FINAL EXAMINATION FOR THE ASSOCIATESHIP (A.I.C.).

1. Candidates who have passed the Intermediate Examination of the Institute or any of the Examinations mentioned in Clause 2 below, are eligible for admission to the Final Examination.

2. Exemption from passing the Intermediate Examination of the Institute is granted to Candidates for the Associateship who have passed any of the following Examinations prior to 1st October, 1902:—

The Final Honours Examination for the degree of B.A. at the University of Oxford in the subject of Chemistry in the School of Natural Science.

The Examination for the degree of B.A. at the University of Cambridge in the subject of Chemistry, and in Part II. of the Natural Sciences Tripos.

The Final or Degree Examination for B.Sc., with Honours in Chemistry, in either of the following Universities: Dublin, Durham, Edinburgh, Glasgow, London, the Victoria University, and the University of Wales.

The Final Examination for the Degree of Bachelor of Science, with Special Distinction in Chemistry, in the Universities of Aberdeen and St. Andrew's.

The Final or Degree Examination for B.Sc. (involving Inorganic and Organic Chemistry) in the Royal University of Ireland.

The Senior Moderatorship in Experimental Science in the University of Dublin.

The Associateship of the City and Guilds of London Central Institute in the Department of Chemistry.

The Associateship of the Royal School of Mines, if taken before 1884.

The Associateship of the Royal College of Science (London) in the division of Chemistry.

The Associateship of the Royal College of Science, Dublin, in the Faculty of Manufactures, together with a Certificate from the Professor of Chemistry in the R.C.Sc., Dublin, or in some other University or College recognised by the Institute, that the Candidate has spent an additional period of six months exclusively in the Chemical Laboratory of such College.

***The following Regulations will come into operation on 1st October, 1902.*

Candidates who pass one of the Examinations mentioned in Clause 2 of Section 7, after 1st October, 1902, will be exempted from passing the Intermediate Examination of the Institute provided that they pass the exempting examination in the Division or Class specified below :—

A First or Second Class in the Final Honour School of Natural Science of the University of Oxford *in the subject of Chemistry.*

A First or Second Class in Part II. of the Natural Sciences Tripos at the University of Cambridge, *with Chemistry as the principal subject.*

The Final Examination for the Degree of B.Sc., *with First or Second Class Honours in Chemistry*, in either of the following Universities:— London (if passed under the Regulations of the University in force prior to January, 1903), Victoria University, and the University of Wales.

The Final Examination for the Degree of Bachelor of Science, *with Special Distinction in Chemistry*, in the Universities of Aberdeen, Edinburgh, Glasgow and St. Andrews.

The Final Examination for the Degree of B.A., with the Final Examination for B.Sc. or M.A. (*involving Inorganic and Organic Chemistry*) in the Royal University of Ireland.

The Senior Moderatorship in Experimental Science in the University of Dublin.

The Final Examination for the Degree of B.Sc. in the University of Durham, or in the University of Birmingham, *in the subjects of Chemistry and Physics, the Candidate's name being placed in either of the first two Divisions, with Chemistry as his principal subject, including Theoretical and Practical Inorganic and Organic Chemistry.*

Candidates who gain one of the following diplomas after 1st October, 1902, will be exempted from passing the Intermediate Examination of the Institute provided that they pass, in addition, an approved Preliminary Examination in accordance with the Regulations (p. 5) :—

The Associateship of the City and Guilds of London Central Institute (A.C.G.I.), in the Department of Chemistry; the Associateship of the Royal College of Science (Assoc. R.C.Sc.), London, in the Division of Chemistry; and the Associateship of the Royal College of Science, Dublin (Assoc. R.S.Sc.I.), in the Faculty of Manufactures, together with a Certificate from the Professor of Chemistry in the R.C.Sc., Dublin, or in some other University or College recognised by the Institute, that the Candidate has spent an additional period of six months exclusively in the Chemical Laboratory of such College.

N.B.—The Regulation requiring Associates of the Royal Colleges of Science (London and Dublin) and Associates of the City and Guilds of London Institute, to pass an approved Preliminary Examination, will not be enforced, however, in the cases of those who produce evidence satisfactory to the Council that they entered on a systematic course of training in Chemistry at a recognised College prior to 1st July, 1902.

3. Candidates may forward, for the inspection of the Examiners, any note-books containing duly authenticated records of practical chemical work of an advanced character done by them since passing the Intermediate Examination or not previously inspected, and the contents will be taken into consideration.

4. The Examination Fee shall be paid at the time of making application for admission to this Examination. The Fee for the Final Examination is Four Guineas (£4 4s.) for Candidates who have passed the Intermediate Examination, and Seven Guineas (£7 7s.) for Candidates who by reason of their Degrees or other qualifications are exempt from passing the Intermediate. If a Candidate withdraws his name, or fails to present himself at the Examination, or fails to pass it, the Fee shall not be returned to him, but he shall be allowed to enter for *one* subsequent Final Examination upon payment of an additional Fee of Two Guineas (£2 2s.). Candidates who have failed more than once are required to pay the full Fee of Four Guineas (£4 4s.).

SYLLABUS OF THE FINAL EXAMINATION.

The Final Examination occupies at least four days, from 10 a.m. to 4.30 p.m. on each day; Branch (e) at least five days.

The Examiners are at liberty to apply any test which they think desirable either viva voce, or by writing, or by experimental work, in order to obtain evidence as to the knowledge of Theoretical and Practical Chemistry possessed by the Candidate.

1. Each Candidate for the Final Examination is required to show a thorough acquaintance with at least one of the following branches of Chemistry, to be selected by himself :—

(*a*) Mineral Chemistry: including General Inorganic Qualitative and Quantitative Analysis, and the preparation of pure Inorganic Substances.

(*b*) Metallurgical Chemistry: including the Analysis and Assay of Metals, Ores, Fuel, Metallurgical Products, and Materials used in Metallurgical Processes.

(*c*) Physical Chemistry: Candidates are expected to show special theoretical and practical knowledge of the Methods, Instruments and Apparatus employed in Physico-chemical Processes and Investigations.

(*d*) Organic Chemistry: including Ultimate Organic Analysis and the estimation of the Proximate Constituents of Organic Mixtures. The Preparation and detailed investigation of Organic Compounds.

* (*e*) Analysis of Food and Drugs and of Water: including the Examination and Analysis of any food or drug within the meaning of the Sale of Food and Drugs Acts; the Assay of Alkaloids; the recognition of Poisonous Chemicals and Crude Drugs ordinarily found in commerce and having well-marked physical characters; the use of the Microscope in the detection of adulterations, substitutions, commonly occurring parasites, and impurities in Food, Drugs and Water.

Candidates in Section (*e*) are required to show a general knowledge of the Therapeutic Effects of Chemicals and Drugs, and of the quantities which, taken internally, would be injurious or fatal to man. [*This part of the Examination is partly oral and partly written. Books of Reference are not allowed during any part of the Examination conducted by the Examiner in Therapeutics, Pharmacology and Microscopy.*]

† (*f*) Biological Chemistry: with special reference to the Chemistry and Bacteriology of Foods, Water, Sewage and Effluents, and the practical applications of Biological Chemistry to Industries.

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* Candidates desirous of becoming qualified as Public Analysts should take Section (*e*) in the Final Examination, which includes the Examination in Therapeutics, Pharmacology and Microscopy, mentioned on pp. 20-21.

† Candidates intending to enter for the Final Examination in Branch (*f*), viz., Biological Chemistry, are recommended to take (after passing the Intermediate Examination, or any Examination qualifying for admission to the Final) a course of instruction including the following work: A course of 40 to 50 Lectures on the Morphology and Physiology of Micro-organisms, with systematic practical works the latter to include—(a) Microscopy, the preparation, staining, mounting, drawing, and recognition of specimens; (b) the preparation and study of pure cultures; (c) the conduct of fermentation experiments and the study of chemical changes brought about by bacteria, moulds, yeasts, &c. *The Examination in Biological Chemistry is held in October of each year.*

2. Candidates for the Final Examination are expected to possess, in addition to a general knowledge of all branches of Chemistry, a *thorough* knowledge of the particular branch of Chemistry selected.

3. Any Candidate is at liberty to present a thesis or dissertation upon any Chemical subject to which he has paid special attention, and the thesis, if approved by the Examiners, may be taken as part of the Examination. The thesis must be forwarded not less than fourteen days prior to the first day of the Examination.

4. All Candidates must be familiar with the use of such scientific instruments as are commonly used in Chemical Laboratories.

8.—ADMISSION OF ASSOCIATES TO THE FELLOWSHIP (F.I.C.).

1. Every Associate applying for admission to the Fellowship is required to produce evidence :—

(*a*) That he is not less than 24 years of age.

(*b*) That he has since his admission as an Associate, and for a period of three years therefrom been continuously engaged in the study and practical work of applied Chemistry in a manner that shall be satisfactory to the Council.

2. Applications must be made to the Council, and must be accompanied by a letter signed by some responsible person, preferably a Fellow of the Institute, testifying that the Candidate has fulfilled the foregoing conditions.

3. The Entrance Fee payable on election to the Fellowship is Five Guineas. No name can be transferred from the Associates' to the Fellows' List until this fee has been paid.

9.—ADMISSION OF NON-ASSOCIATES TO THE FELLOWSHIP (F.I.C.).

1. In exceptional cases Candidates who produce evidence satisfactory to the Council that they are proficient in the Sciences of Analytical and Applied Chemistry and in the allied Sciences, may be elected to the Fellowship.

2. It rests with the Council to determine in each case whether a Candidate applying for the Fellowship shall be exempted from passing any Examination, or shall be required to pass either the Intermediate or Final Examination or both. The Entrance Fee to the Fellowship is Five Guineas (£5 5s.), but if an examination be imposed, an Examination Fee (£10 10s.) must be paid in addition.

3. Every Candidate for Election to the Fellowship under this Section is required to produce evidence of age, and a satisfactory certificate of moral character.

10.—SPECIAL EXAMINATION IN THERAPEUTICS, PHARMACOLOGY AND MICROSCOPY.

The Council have made special provision for Fellows and Associates who are desirous of becoming qualified for appointments as Public Analysts by establishing an Examination in Therapeutics, Pharmacology and Microscopy, to enable such Members to comply with the Regulations of the Local Government Boards with regard to the evidence of competency required for such appointments.

The possession of the diploma of Fellowship or Associateship of the Institute of Chemistry, together with the Certificate granted on passing this Examination, is accepted by the Local Government Board for England and Wales, and the Local Government Boards for Scotland and Ireland, as evidence that the holder is fully qualified for the office of Public Analyst under the Sale of Food and Drugs Acts.

QUALIFICATIONS FOR PUBLIC ANALYSTS.

Candidates for this Examination should have been instructed in the recognition of specimens of drugs and poisonous chemicals ordinarily to be found in commerce or employed for technical purposes in the Arts or Manufactures; the detection, by microscopical or chemical examination, of adulterations, substitutions, commonly occurring parasites, and impurities in food and drugs, and in the therapeutic effects of ordinary drugs, and of the quantities of such drugs or poisonous chemicals which when taken internally would be injurious or fatal to man.

The Examination in Therapeutics, Pharmacology and Microscopy is open to any Fellow or Associate of the Institute of Chemistry, and to any Candidate who has passed the Final Examination for the Associateship but is under the age requisite for election, who can produce evidence satisfactory to the Council that he has been systematically engaged in the practice of the Analysis of Food and Drugs for at least one year prior to the date of his application for admission to the Examination.

The Examination is practical, written and oral, and will not occupy more than one day.

Books of Reference are not allowed during this Examination.

The Fee for this Examination is Two Guineas (£2 2s.). For Candidates who have failed *once* the Fee is One Guinea; Candidates who have failed more than once pay Two Guineas.

If a Candidate whose name is entered on the List for an Examination fails to present himself or withdraws from the Examination the fee will not be returned to him, but he will be permitted to enter for a subsequent Examination on payment of an additional Fee of One Guinea.

Each Candidate who is successful in this Examination will receive a Certificate in addition to the Certificate of Membership.

11.—GENERAL INSTRUCTIONS TO CANDIDATES FOR EXAMINATION.

1. The Intermediate and Final Examinations are held each year in January and July, except the Final Examination in Biological Chemistry which is held in October.

2. Forms of Application for admission to Examination, which may be obtained from the Registrar, must be filled up and forwarded to the Office of the Institute and must be accompanied by the necessary enclosures mentioned in these Regulations and referred to in the forms.

3. No name will be placed on the list of Candidates for Examination unless the application, the note-books, declarations, and fee of the Candidate have been received at the Office of the Institute on or before the date fixed for the closing of the list.

4. Due notice of Examination will be given to each Candidate whose application has been accepted by the Council; but no notice will be forwarded to any Candidate who has not presented himself for Examination within a period of two years from the date of the acceptance of his application, or of his failure at an Examination.

5. The dates of the Examinations will be published in the principal daily papers and scientific journals.

6. Candidates who have previously entered for Examination are not required to fill in new forms of application.

7. Note-books will be provided for the record of the work done at the Examinations. Candidates are required to write their names and bench numbers on the outside of the cover. Each Candidate must make a short summary of his work at the end of his note-book. All calculations must be made by the Candidate in the Examination Laboratory and must be entered in his note-book during Examination hours with an account of the work. Candidates are not permitted to take away their note-books from the Examination Laboratories, and they must deliver them to the Examiners whenever requested.

8. Any other instructions for the Examinations will be given by the Examiners or stated in the Examination papers.

9. The list of names of successful Candidates will be sent, as soon as copies are available, to every successful Candidate and to every University, College, or School recognised by the Council, from which any Candidate has proceeded to the Examination. It will also be circulated among the leading newspapers of the United Kingdom.

Unsuccessful Candidates will be informed of the subjects in which they have failed, as soon as possible after the publication of the Pass List.

At the Council Meeting to which the Report of the Examiners is submitted successful Candidates will be proposed for election to the grade for which they were examined.

12.—LIST OF FEES.

	£	s.	d.
STUDENTS.			
Registration Fee (Annual)	0	5	0
EXAMINATION FEES.			
*†Intermediate Examination	3	3	0
*First Examination after Failure	2	2	0
*Each subsequent Intermediate Examination	3	3	0
†Final Examination for Associateship for Candidates who have passed the Intermediate Examination	4	4	0
*For Candidates who have been exempted from passing the Intermediate Examination	7	7	0
*First Examination after Failure	2	2	0
*Each subsequent Examination	4	4	0
For Examination for the Fellowship under Section 9	10	10	0
For each Examination after Failure..	2	2	0
Examination in Therapeutics, Pharmacology and Microscopy (p. 20), open to Fellows and Associates ...	2	2	0
*First Examination after Failure	1	1	0
*Each subsequent Examination...	2	2	0
ENTRANCE FEE TO THE FELLOWSHIP.			
In the case of Associates elected as such prior to 1st January, 1898:—			
(*a*) If admitted Fellows prior to 31st December, 1902:	4	4	0
(*b*) If admitted Fellows after 31st December, 1902:	5	5	0

*†The Fee for the Intermediate Examination for Students registered prior to July 1st, 1897, and for Candidates whose applications for Examination were accepted prior to that date, is £2 2*s.*; and the Fee for the Final Examination for such Candidates is £3 3*s.* The Fee for the first Examination after failure for such Candidates is £1 1*s.* for the Intermediate and £2 2*s.* for the Final Examination.

FEES.

	£	s.	d.
In the case of Associates elected as such after 1st January, 1898 :—			
(*a*) If admitted Fellows prior to 31st December, 1905 :	4	4	0
(*b*) If admitted Fellows after 31st December, 1905 ...	5	5	0
For Non-Associates :—			
(*a*) If accepted for Examination for Fellowship prior to 1st January, 1902, and admitted to the Fellowship before 31st December, 1902...	4	4	0
(*b*) If admitted without Examination after 1st January, 1902	5	5	0
(*c*) If admitted with or without Examination after 1st January, 1903...	5	5	0

ANNUAL SUBSCRIPTION.

For Fellows and Associates	1	1	0

LIFE COMPOSITION.

In lieu of the Annual Subscription (open only to persons who attain the Fellowship) :—			
For Associates elected Fellows before 31st December, 1905	16	16	0
For Non-Associates elected Fellows after 1st January, 1902	21	0	0
For all persons elected Fellows after 31st December, 1905	21	0	0

No Candidate is admitted either as Student, Associate, or Fellow until the first Annual Subscription has been paid ; and in the case of Fellows, the Entrance Fee must have been paid in addition.

No name is entered on the List of Candidates for an Examination until the fee for the Examination has been paid.

EXAMINATION PAPERS, 1901-1902.

Examiners in Chemistry.
BERNARD DYER, D.Sc. (Lond.), F.I.C.
W. PALMER WYNNE, D.Sc. (Lond.), F.R.S., F.I.C.

Examiner in Therapeutics, Pharmacology and Microscopy:
ARTHUR PEARSON LUFF, M.D. (Lond.), F.R.C.P., B.Sc. (Lond.), F.I.C.

JULY EXAMINATIONS, 1901.

Intermediate Examination.

July 2nd to 5th, 1901; 10 a.m. to 4.30 p.m. each day.

GENERAL AND THEORETICAL CHEMISTRY.

Tuesday, July 2nd, 1901; 10 a.m. to 1 p.m.

Not more than *four* of the following questions are to be attempted:—

1. On what grounds are magnesium, zinc and cadmium included in the same group of elements?

2. Describe and explain the uses of (1) potassium permanganate, (2) yellow ammonium sulphide, and (3) sodium thiosulphate in analytical operations.

3. Describe the appearance and properties of (*a*) chromyl chloride, (*b*) anhydrous chromic chloride, and (*c*) chrome alum,

and state how you would prepare a specimen of each substance from potassium dichromate.

4. From what sources and by what methods is citric acid manufactured? What are its properties, and in what way has its constitution been established?

5. Describe how (*a*) ethyl bromide, (*b*) bromotoluene, and (*c*) benzyl bromide can be prepared, and contrast their properties.

6. On what evidence is the identification of urea with carbamide based? Describe the characteristic properties of the substance, and explain the methods by which it can be estimated quantitatively.

2 p.m. to 4.30 p.m.

Not more than *four* of the following questions are to be attempted:—

7. Explain how you would proceed if required to determine the vapour density of chloroform by the Victor Meyer process. Why is it unnecessary to ascertain the temperature at which the operation is conducted?

8. If given a red and a black powder, how would you prove that each is an oxide of copper, and that one contains relatively twice as much oxygen as the other?

9. Hydrides may be formed either by direct combination of the elements involved, or by indirect processes. Classify these compounds under the two headings, and discuss the effects of increasing atomic weight on the properties of the hydrides of elements belonging to one of the vertical series in the periodic table.

10. Explain the use of (*a*) aluminium chloride, (b) caustic alkali, and (*c*) acetyl chloride in organic chemistry.

11. By what independent methods can phenol be converted into (*a*) salicylaldehyde, (*b*) salicylic acid? How would you prove that these substances are ortho-di-derivatives of benzene?

12. Give an account of the preparation and distinctive properties of the isomeric dihydroxybenzenes.

WEDNESDAY, JULY 3RD, 1901.

The given solution contains an arsenite. Estimate the quantity of arsenious oxide per litre by a volumetric process, and check your result by a gravimetric determination.

What radicles are present in the given organic substance? (Nitrobenzoic acid; *p*-nitrophenol. *One* to each Candidate.)

THURSDAY, JULY 4TH, 1901.

Hydrolyse some of the given organic substance by boiling with caustic alkali, and identify the products. Determine the quantity of one of them obtainable from one litre of the given solution. (Parabanic acid in aqueous solution.)

Analyse qualitatively the given alloy.

FRIDAY, JULY 5TH, 1901.

Identify the gases produced by the action of dilute sulphuric acid on the given solution, and by means of apparatus devised by yourself estimate the proportion of one of them in the mixture. (Urea and potassium nitrite).

Analyse qualitatively the given mixture.

(Calcium tartrate and potassium fluoride; calcium phosphate and potassium formate; calcium oxalate and borax. *One* mixture to each Candidate.)

Examination in General Practical Chemistry.

July 2nd to 5th, 1901; 10 a.m. to 4.30 p.m. each day.

The Candidate for this Examination was asked to perform the exercises set for the Intermediate Examination during the last three days and on the first day was given the following exercise:—

TUESDAY, JULY 2ND, 1901.

Determine the phosphoric acid and the total nitrogen in the sample of guano.

Final Examinations for the Associateship.

July 9th to 12th, 1901; 10 a.m. to 4.30 p.m. each day.

Branch "A."—Mineral Chemistry.

TUESDAY, JULY 9TH, 1901.

(*a*) The sample of water submitted to you is supposed to be from the only source available for boiler purposes. Analyse it sufficiently to enable you to report as to the best means of softening it, and draw up precise recommendations for softening, based on the results of your analysis.

(*b*) Make as full an analysis as you can of the sample of clay.

(The latter analysis may be finished to-morrow.)

Wednesday, July 10th, 1901.

(*a*) Finish the analysis of the sample of clay begun yesterday.

(*b*) Make as full a qualitative analysis as you can of the sample of ore, distinguishing between elements present in relatively large amount and those which may be present in merely insignificant quantities.

Thursday, July 11th, 1901.

Determine the percentage of chromium in the sample of chrome iron ore.

Friday, July 12th, 1901.

Make a quantitative analysis of the given mixture of gases (a mixture of nitrogen, carbon monoxide, carbon dioxide and a little oxygen).

Branch "B."—Metallurgical Chemistry.

Tuesday, July 4th, 1901.

Determine the percentage of lead and of silver in the ore submitted to you.

Wednesday & Thursday, July 10th & 11th, 1901.

(*a*) Make as complete an analysis as you can of the metallic alloy (an alloy of antimony, tin and lead).

(*b*) Determine the percentage of phosphoric acid in the sample of basic slag.

(Two days allowed for both these analyses).

FRIDAY, JULY 12TH, 1901.

Determine the percentages of carbon and hydrogen in the sample of coal.

July 2nd to 5th, 1901; 10 a.m. to 4.30 p.m. each day.

Branch "D."—Organic Chemistry.

TUESDAY, JULY 2ND, 1901.

Investigate the nature of the given substance (Acetoxime), and estimate the percentage of one of its constituent elements.

WEDNESDAY, JULY 3RD, 1901.

Identify the given substance, A, and prepare from it a specimen of the corresponding hydrocarbon. (Benzonitrile.)

Investigate qualitatively the nature of the given substance B. (Quinine Citrate.)

THURSDAY, JULY 4TH, 1901.

Determine the optical characters of the given substance, A (Ethyl tartrate), and from it prepare a crystalline derivative.

Estimate the percentage of halogen in the given su stance, B. (Bromocamphor.)

FRIDAY, JULY 5TH, 1901.

Investigate the given substance (Quinol), and from it prepare a characteristic derivative.

Branch "E."—The Analysis of Food and Drugs, and of Water.

July 9th to 12th, 1901; 10 a.m. to 4.30 p.m. each day.

Candidates in Branch "E" of the Final Examinations were required to take the Examination in Therapeutics, Pharmacology, and Microscopy, on July 13th (*see p. 33*).

TUESDAY, JULY 9TH, 1901.

Examine the sample of oil as fully as you can in one day (Linseed Oil). Identify it, giving clearly your reasons for the identification.

WEDNESDAY, JULY 10TH, 1901.

(*a*) Determine approximately the proportions of chicory and coffee in the mixture given to you.

(*b*) Report on the genuineness of the sample of tincture of jalap, having regard to the requirements of the British Pharmacopœia.

(*c*) Examine the sample of bread qualitatively to ascertain the presence or absence of alum.

THURSDAY, JULY 11TH, 1901.

(*a*) Determine the percentages of cane sugar, milk sugar, and fat in the sample of condensed milk. (The fat determination may be finished to-morrow.)

(*b*) Write a short report, with regard to its suitability for drinking purposes, on the water represented by the analytical results placed before you.

FRIDAY, JULY 12TH, 1901.

Examine the sample of beer submitted to you, to ascertain the presence or absence of arsenic. If you find arsenic to be present, estimate as nearly as you can the quantity contained in one gallon of the beer.

Examination in Therapeutics, Pharmacology and Microscopy.

Saturday, July 13th, 1901; 10 a.m. to 12 noon.

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1. Examine the specimen of butter marked A, and report on its probable purity or otherwise, basing your opinion on the microscopical appearances only. Leave a prepared slide on your bench.

2. Examine, describe and state respectively the nature of the prepared slides marked B and C.

3. Mention by name the "vermin killers" commonly met with in commerce, and state to what substance or substances each owes its poisonous properties. What amount of each "vermin killer" would probably prove fatal to an adult?

4. Mention the preserved vegetables in which copper salts are occasionally employed as colouring agents. State your views as to the effects of such admixture on the health of persons consuming such vegetables.

5. Give the average fatal doses for an adult of the following poisons:—Oil of vitriol, oxalic acid, phosphorus, lead acetate, commercial carbolic acid, opium.

Candidates were also examined practically as to the recognition of Drugs and interrogated orally.

JANUARY EXAMINATIONS, 1902.

Intermediate Examination.

January 7th to 10th, 1902: 10 a.m. to 4.30 p.m. each day.

GENERAL AND THEORETICAL CHEMISTRY.

Tuesday, January 7th, 1902: 10 a.m. to 1 p.m.

Not more than *four* of the following questions are to be attempted :—

1. State what you know about the solution of gases in liquids. If water at 0 deg. C. be exposed to an atmosphere consisting of oxygen 20·9, nitrogen 79, and carbon dioxide 0·1 per cent., what will be the percentage composition of the gas dissolved, the pressure being supposed to be normal? (1 vol. of water at 0 deg. and 760 mm. dissolves 0·4 vol. of oxygen, 0·2 of nitrogen or 1·8 vols. of carbon dioxide.)

2. How may carbon monoxide be prepared in a pure state, and how has its composition been determined? Describe its properties and those of the compounds which it forms with elements other than oxygen.

3. At the present time, alkali is made on the industrial scale by processes other than the Leblanc method, sulphuric acid without the use of "leaden chambers," and potassium chlorate without the aid of manganese dioxide or "Weldon

mud." Give some account of these modern processes of manufacture.

4. By what methods applicable both to fatty and to aromatic compounds can (1) an ether, and (2) an ester be prepared? Contrast the chemical properties of ethers and esters, and state how you would ascertain whether a given substance belonged to one or the other of these classes.

5. Give an account of the *general* methods adopted in the isolation and recognition of alkaloids. Of what substances are alkaloids considered to be derivatives, and what evidence is there in support of your answer?

6. Describe briefly the more important properties of the metallic cyanides. What substances are formed by the action of ethyl iodide on silver and potassium cyanides, and what are their properties?

TUESDAY, JANUARY 7TH, 1902: 2 P.M. TO 5 P.M.

Not more than *four* of the following questions are to be attempted:—

7. Explain fully the grounds on which the atomic weight 31 is assigned to phosphorus.

8. How would you prepare potassium dichromate from chrome iron ore? What reasons exist for classing chromium with iron?

9. Give an account of the indicators ordinarily employed in volumetric analysis, the conditions under which they may be employed, and the explanations which have been given of their action.

10. Justify the formula $CH_3{\cdot}CH{:}O$ for ordinary aldehyde. Describe the chemical properties of the substance, and explain its unsaturated character.

11. What is a nitro-compound? How are such substances made, what are their properties, and for what purposes are they used?

12. Trace out the regularities that have been observed in the formation of di-derivatives from mono-substitution derivatives of benzene. What evidence is there that phenyl is a more acidic radicle than methyl?

PRACTICAL CHEMISTRY.

Wednesday, January 8th, 1902: 10 a.m. to 4.30 p.m.

Determine the nature of the substance contained in the given solution, and estimate the amount per litre, by two distinct methods. (N.B.—Evaporation to dryness must not be employed.)

(Sodium Nitrite.)

By the aid of the dissolved substance prepare some definite organic compound in a pure state, and leave a specimen of it for inspection. Before proceeding to this part of the work, write in your notebook a brief account of what you propose to do, and a list of the materials you require. These materials will be supplied to you after your scheme of work has been submitted to the Examiners.

Thursday, January 9th, 1902: 10 a.m. to 4.30 p.m.

Identify the substances contained in the given solution, and determine the amounts of each per litre.
(Ferrous Ammonium Sulphate, Ferric Ammonium Sulphate.)

Friday, January 10th, 1902: 10 a.m. to 4.30 p.m.

Identify the given substance A.
(Stibnite; Zinc blende. One substance given to each Candidate).

Identify the given substance B. Estimate the percentage of one of the radicles contained in it. Prepare from it a solid and a liquid organic substance in a pure state, and leave specimens for inspection.

(Acetyl Chloride.)

Final Examinations for the Associateship.

Branch "A." — Mineral Chemistry.

January 14th to 17th, 1902.

Tuesday, January 14th, 1902: 10 a.m. to 4.30 p.m.

(*a*) Determine the nitrogen existing as nitrates in the given sample of water.

(*b*) Make as full a qualitative analysis as you can of the given ore, distinguishing between principal and minor constituents.

Wednesday, January 15th, 1902: 10 a.m. to 4.30 p.m.

Determine in the given ore the percentage of arsenic and of one other principal constituent element. (This exercise may be completed to-morrow.)

Thursday, January 16th, 1902: 10 a.m. to 4.30 p.m.

The sample submitted to you consists of commercial borate of lime. Determine the percentage of boric acid in it, and otherwise make as complete a quantitative analysis of it as you can.

FRIDAY, JANUARY 17TH, 1902: 10 A.M. TO 4.30 P.M.

Make as complete a quantitative analysis as you can of the given powder, determining the most characteristic ingredient by a volumetric method, and also, if time allows, by a gravimetric method.

(Calcium Chromate, Calcium Carbonate, and Barium Sulphate.)

Make notes of each experiment.

Branch "D." — Organic Chemistry.

January 14th to 17th, 1902.

TUESDAY, JANUARY 14TH, 1902: 10 A.M. TO 4.30 P.M.

Identify the substance contained in the given aqueous solution, and confirm your conclusion by estimating the amounts of two of its decomposition products obtainable from a given volume of the solution.

Prepare a crystalline salt containing at least one organic radicle from one of the decomposition products.

(Oxamethane.)

WEDNESDAY, JANUARY 15TH, 1902: 10 A.M. TO 4.30 P.M.

Identify the given substance and prepare from it three characteristic derivatives, giving in each case an account of the solubility, melting point, &c., of the specimen.

(β Naphthol.)

THURSDAY, JANUARY 16TH, 1902: 10 A.M. TO 4.30 P.M.

Make as complete an analysis as you can of the given substance. Leave for inspection the substances weighed.

(Citrate of iron and quinine.)

FRIDAY, JANUARY 17TH, 1902: 10 A.M. TO 4.30 P.M.

Identify the given substance and determine its molecular weight.

Prepare from it (*a*) a halogen derivative containing the same number of substituents as the given substance; and (*b*) a halogen derivative, in which the halogen forms an additional substituent in the molecule of the given substance.

Leave specimens of the products, with a description of their solubilities, &c., relied on as criteria of purity.

(Orthotoluidine.)

(N.B.—Before you proceed to the second part of the exercise, a brief description of the process you propose to employ and a list of the materials required must be shown to one of the Examiners.)

Make notes of each experiment.

Branch "E."—The Analysis of Food and Drugs, and of Water.

January 7th to 11th, 1902.

TUESDAY, JANUARY 7TH, 1902: 10 A.M. TO 4.30 P.M.

The wine placed before you contains poison. Identify the poison and determine approximately the quantity present, expressed as grains per pint.

(Tartar Emetic; Strychnine; Oxalic Acid. One of these given to each Candidate.)

WEDNESDAY, JANUARY 8TH, 1902: 10 A.M. TO 4.30 P.M.

(*a*) Estimate by means of a nitrogen determination the percentage of casein in the sample of cheese.

(*b*) Examine and report upon the genuineness o the sample of tea.

THURSDAY, JANUARY 9TH, 1902: 10 A.M. TO 4.30 P.M.

(*a*) Determine the percentage of butter fat in the sample of margarine fat.

(*b*) Report on the genuineness of the sample of glycerine.

FRIDAY, JANUARY 10TH, 1902: 10 A.M. TO 4.30 P.M.

(*a*) Determine the proportion of total alkaloid or alkaloids in the given alcoholic extract, and identify as well as you can the characteristic ingredient by means of the alkaloidal reactions.

(Extract of Ipecacuanha.)

(*b*) Determine by means of the polarimeter, and without using Fehling's solution, the percentage of uninverted cane sugar (sucrose) in the sample of syrup.

Candidates in Branch "E" of the Final Examination were required to take the Examination in Therapeutics, Pharmacology, and Microscopy, on January 11th (see below).

Examination in Therapeutics, Pharmacology and Microscopy.

Saturday, January 11th, 1902: 10 a.m. to 12 noon.

1. Examine the specimen of coffee marked A, and report on its probable purity or otherwise, basing your opinion on the microscopical appearances only. Leave a prepared slide on your bench.

2. Examine, describe and state respectively the nature of the prepared slides marked B and C.

3. What articles of food and drink are liable to contain lead? Describe the sources from which the lead is derived, and the methods by which it is introduced into the respective articles. What are the effects on the human body produced by the daily ingestion of small quantities of lead?

4. What are the distinctions, as regards their action on the human body, of corrosive and irritant poisons? Mention four purely corrosive and four purely irritant poisons.

5. Give the maximum safe doses, for an adult, of arsenious oxide, morphine acetate, atropine sulphate, and hydrocyanic acid (B.P.)

Candidates were also examined practically, and interrogated orally as to the recognition of Drugs.

List of Universities, Colleges and Institutions, recognised for the Training of Candidates for the Examinations of the Institute of Chemistry.

Aberdeen	The University.
Aberystwyth	University College.
Bangor	University College.
Belfast	Queen's College.
Birmingham	The University.
Bristol	†Merchant Venturer's Technical College.
,, ...	University College.
Cambridge	The University.
Cardiff	University College.
Cork	Queen's College.
Dublin	Royal College of Science for Ireland.
,, ...	Trinity College.
Dundee	University College.
Edinburgh	†The Heriot-Watt College.
,, ...	†*Surgeon's Hall.
,, ...	The University.
Galway	Queen's College.
Glasgow	The University.
,, ...	The Glasgow and West of Scotland Technical College.
Leeds	Yorkshire College.
Liverpool	University College.
London	City and Guilds Institute, Central Institution.
,, ...	City and Guilds Institute, Finsbury Technical College.
,, ...	King's College.
,, ...	Royal College of Science.
,, ...	*School of the Pharmaceutical Society of Great Britain.
,, ...	University College.
Manchester	Owens College.
Newcastle-on-Tyne ...	Durham College of Science.
Nottingham	University College.
Oxford	The University.
Sheffield	Firth College.
St. Andrew's	The University.

*Recognised for Chemistry only. †Recognised Provisionally.

Institute of Chemistry Laboratories,

30, Bloomsbury Square, London, W.C.

The Laboratories of the Institute of Chemistry may be used by other Examining Bodies and Institutions for Examination Purposes.

Particulars may be obtained from the Registrar.

A. P. Blundell, Taylor & Co., Printers, 173, Upper Thames Street, London, E.C.